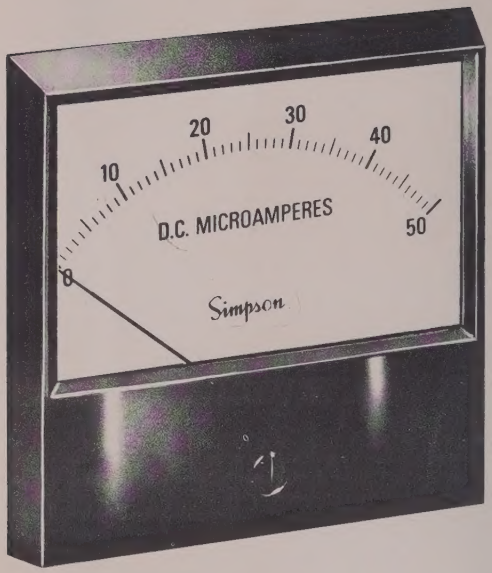
SIMPSON ELECTRIC COMPANY

INSTRUCTION MANUAL
MODEL 2762
STRIP CHART RECORDER

DUAL RANGE—DUAL CHANNEL
DUAL CHART SPEEDS-CHART TAKE-UP
PORTABLE OR PANEL MOUNTING

SIMPSON ELECTRIC COMPANY 5200 WEST KINZIE CHICAGO 60644 ILLINOIS (312) 379-1121



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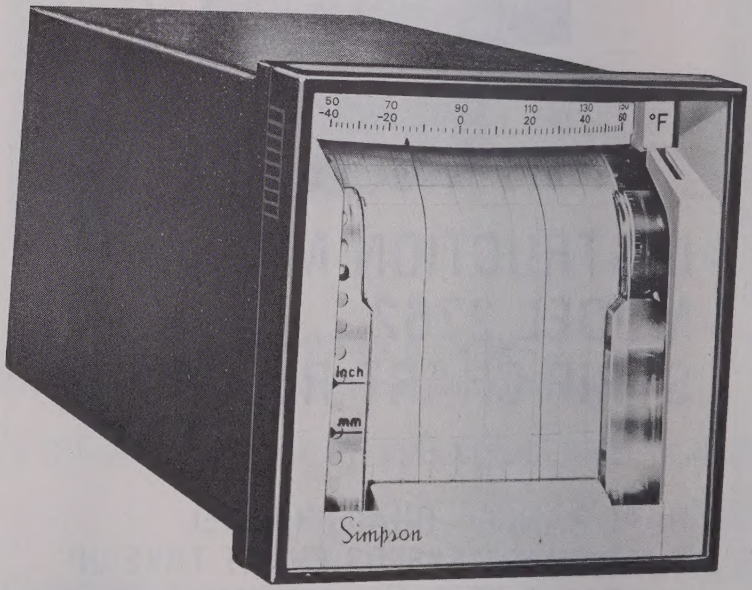

FIG. 1. MODEL 2762 STRIP CHART RECORDER

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GENERAL DESCRIPTION

The Simpson Model 2762 is a clamp type low speed strip chart temperature recorder utilizing pressure sensitive paper and a thermistor input. It uses a rugged taut band instrument movement as the measuring means. The unit is designed to meet modern industry needs for a recorder which combines accuracy and quality with simplicity and low cost. In addition to the taut band movement, other features of this recorder are; solid state circuit components for power regulation, compensation for load and line voltage variations, and a unique motor-drive mechanism assuring uniform chart speed.

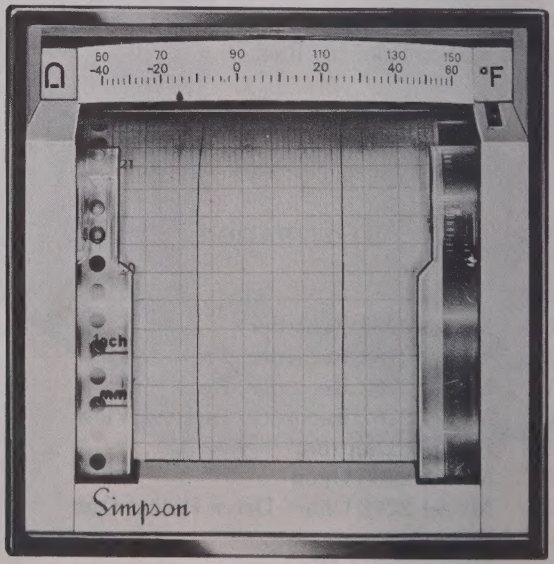


FIG. 2. MODEL 2762, FRONT VIEW

The Model 2762 recorder provides a recording by making sequential impressions on pressure sensitive chart paper. Every 6 seconds, the self contained synchronous motor activates a bar which clamps the movement pointer momentarily against the paper. This compresses the wax film on the paper, and produces a black dot. Successive black dots produce an apparently continuous line on the paper. The problem of recording pen and ink has been eliminated. The meter movement is free to follow changes in the input sensing element at all times other than the momentary clamping period. For catalog number of chart paper, see section under ACCESSORIES. The recorder measures and monitors temperatures from $-40°$ to $150°$ F in two ranges. The two black range knobs, having white markings, are conveniently located on the back of the unit. (See Figure 3) The two position switches, A and B located on the rear panel, allows selection of reading and recording on either the low or high range of temperature for each channel.

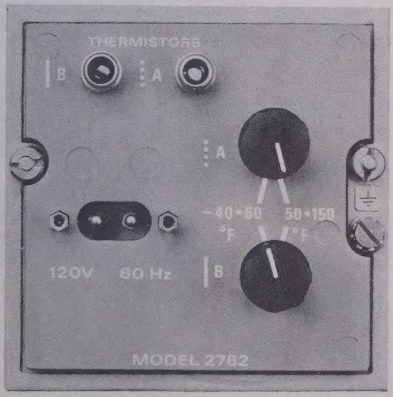


FIG. 3. MODEL 2762, REAR VIEW

In order to simultaneously monitor two separate inputs and record on the full width of the chart paper, the Model 2762 dual channel recorder uses a switching device that alternately connects the instrument movement to one of the two input channels. Different time intervals are synchronized with the clamping bar mechanism, using a dot sequence of 6 seconds.

The identification between input channels is made by the number of dot impressions. Five dots are used for input channel "B" and one dot is used for input channel "A". The sequence of 5 dots for input channel "B" will produce a dark heavy line and a single dot for channel "A" will produce a light fine line; therefore, the two lines are easy to identify.

The mechanical design of the unit emphasizes functional simplicity. External wiring connections to the thermistor sensing elements are made through plug-in jacks. The main recorder components are housed in a protective steel enclosure. The removable front window allows notations to be made directly on the chart paper, and provides access to the chart drive mechanism. Changes in gear speed, replacement of the chart rolls and operation of the on-off switch are performed from the front of the recorder after removing the front window.

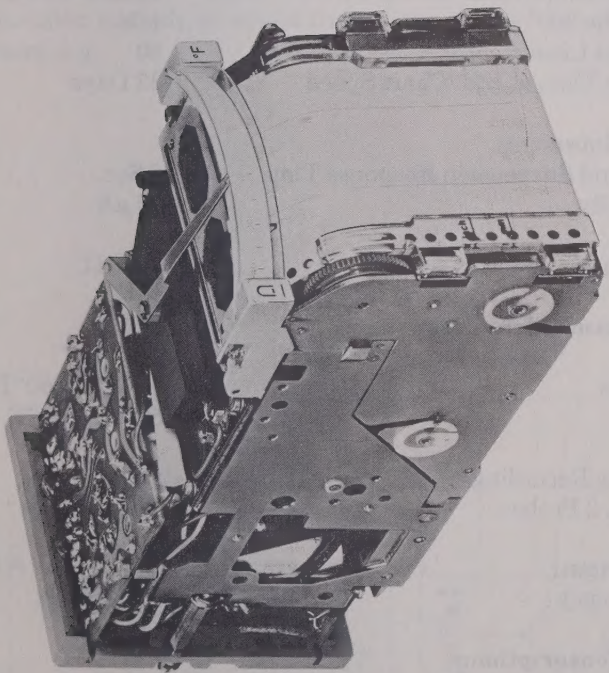


FIG. 4. MODEL 2762 RECORDER, INTERIOR VIEW

TECHNICAL SPECIFICATIONS

Recording:	
Dot Impressions on Chart Paper every	6 Sec.
Chart Paper Width	2.56 Inches
Recording Width	2.30 Inches
Length of Paper on Roll	50 Feet
Chart Speed (0.79 or 4.72 in/hr)	20 or 120 mm/H
Time Imprint	1-24
Divisions Linear	50
Running Time at Std. Chart Speed	32 Days
Meter Movement:	
Taut Band Suspension Response Time	2 Sec.
Sensitivity	35 μA
Resistance	2000 Ω
Temperature Measuring:	
2 Ranges	-40° to 60°F 50° to 150°F
Accuracy Recording	$\pm 2^\circ$F
Sensing, 2 Probes	Thermistors
Power Input:	105 to 130V A.C.
Frequency	50 to 60 Hz
Power Consumption:	2 W.
Dielectric Test Voltage:	500 V
Physical Specifications:	See Figure
Weight:	4½ Lbs.

Measuring Circuit Description: The recorder requires 2 watts of power at 115 volts AC input. The power supply consists mainly of a step down transformer, bridge rectifier and a filter. Stability against line input fluctuation or load variation is accomplished with transistorized regulation. For best accuracy provision is made to adjust the voltage at the base of a series transistor.

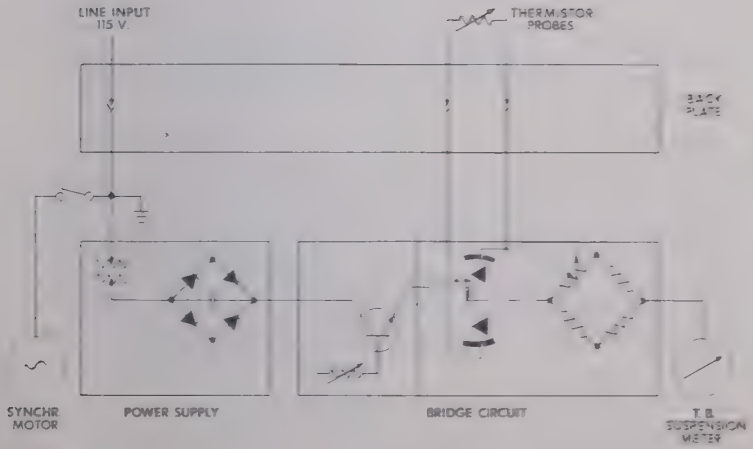


FIG. 5. BLOCK DIAGRAM

Opening and Closing the recorder: (See Fig. 6) The Model 2762 recorder has a phenolic cover with a glass window. It is held to the case by a spring catch. To open, grip the fluted edges of the cover firmly, pull out at the top and lift slightly to disengage cover from case. When closing, be sure to place the two projections on the bottom of the cover into the corresponding holes in the case. To prevent unauthorized opening of the recorder, a wire seal may be used in the holes (3) in the upper right hand corner of the case.

Locking lever: With the cover removed, a locking lever (4) will be found located in the upper right hand corner of the case. When the locking lever is pushed down in line with the green section (5) on the label, the motor is switched on and the chart drive unit is locked in the case. When the lever is pushed up in line with the red section, the chart drive unit is unlocked, the clamping bar is locked in its upper position and the motor is switched off. At this time the pointer of the movement is released and the chart drive can be pulled out of the case for replacing the chart roll or changing the chart speed.

Insertion of chart paper: (See Fig. 7) After having removed the phenolic cover, place locking lever in line with red mark (6). Use finger holds (7) to pull out chart drive unit until spring catch engages, and then tilt the unit forward. The feed spool (8) and the take up spool (11) are now accessible. These two spools are inserted in slots (9), (12) at the sides of the chart drive unit. They are kept in working position by means of spring catches (10), (13).

For proper insertion of new chart paper the following step by step instructions should be followed closely:

1. The feed spool (8) should be taken out with one hand, while the other hand keeps the chart drive unit from sliding back into the case. To disengage the spring catches (10), get a firm grip on the feed spool and press at a right angle to the slot against the spring catches. With the spring catches disengaged, the feed spool will slide easily out of the slots.

2. If there is used chart paper on the take up spool, it must be removed before insertion of a new chart roll. To remove the used chart paper, grasp the take-up spool from below, disengage spring catch by pressing the spool forward, and slide it out of the slots (12). The chart guides (14) should now be opened to remove the recorded chart.

3. The take-up spool has a removable flange which has to be pulled off before sliding the used roll off the spool. This removable flange is located close to the right hand side of the chart drive unit.

4. Install new chart roll with the perforations on the flange side and slide it against the flange. When reinserting feed spool, check for correct position (perforations on the left). Pull off about 8 inches of paper from feed spool and cut the end to a tapered point. With chart guides open, insert the chart so that the pins of the chart drive roller engage the perforations of the paper.

After replacement of the removable flange, the pointed end of the chart is inserted into the slot on the take-up spool with the front side of the chart facing the inside of the spool and the perforated side of the chart strip touching the flange with the pinion gear. Wind a few turns on the spool to prevent the chart from disengaging. Close chart guides, tilt chart drive unit up and slide into case. Push locking lever down in line with green section and replace cover. When reinserting take-up spool, make sure that the removable flange is on the right hand side of the chart drive. Tighten chart by turning knurled flange on feed spool.

Adjustment of time scale on chart: On the Model 2762 recording is done at the clamping bar. Since this point is not visible from the front of the recorder, it is not possible to conveniently align the appropriate time line with the recording point. For this reason a reference point, a red line marked "MM", is provided on the left chart guide.

The distance between the recording point and the reference line is 60 MM. For various chart speeds, this distance will represent different time intervals. To determine the proper time interval adjustment, the chart speed must be known. The unit of the time scale on the chart depends upon the position of the gear change lever. When the gear change lever is in the position marked "X6" the speed marked in parentheses on the gear unit applies.

For the standard gear unit, 20/120 mm/hour and the optional gear units 30/180 mm/hour, 60/360 mm/hour in the position marked X1, each line represents 1 hour, in position marked X6, each line represents 10 minutes. Since the chart has the lines numbered from 1 to 24, the chart can be read like a clock when the standard gear unit is used with the gear change lever

in the X1 position. In the X6 position. the time is in multiples of 10 minutes. Thus a total of 240 minutes (4 hours) would be represented by a recording from one line marked 24 to the next one. On the chart for the 100/600 mm/hour gear unit the unit of the scale is 6 minutes of 1 minute according to gear change lever position. The scale is marked from 0 to 9. the numbers indicating 1/10 hours or minutes for the two different chart speeds. For a given chart speed the time adjustments for starting the recording can be computed using the formula:

$$(\text{time adjustment}) = \frac{\text{distance (60 mm)}}{\text{chart speed}}$$

This time adjustment is then subtracted from the actual starting time and the chart is aligned at the "mm" mark to indicate the starting time minus time adjustment. The table on page 0 lists the time adjustment for each of the available chart speeds. For example: assume that a standard gear unit was set up with the gear change lever in the X1 position. The time adjustment from the chart would be 3 hours. If the actual time the recorder started was 10 o'clock the 7 line would be aligned with the "mm" mark on the left chart guide.

Gear Change Lever Position	Gear Unit Marking (mm/hour)			
	20/120	30/180	60/360	100/600
"X1"	3 h	2 h	1 h	36 min
"X6"	30 min	20 min	10 min	6 min

Zero adjustment on chart: Disconnect leads to measuring circuit terminals and adjust pointer with zero adjuster Fig. 6 (1) until the recorded line coincides with the zero line on the chart.

Gear unit exchange: To remove gear unit from chart drive; loosen screw Fig. 7 (22), slide gear unit up and tilt it out at the bottom to disengage gears. To install gear unit; engage the slots over the corresponding pins on the chart drive, making sure that gears engage properly before locking gear unit with screw (22).

Selection of chart speed: For a specific chart speed, select gear unit with indicated speed on label. If the speed desired is marked in parentheses on the label, place gear change lever in position marked X6. The other speed applies with the gear change lever in the position marked X1. To change position of gear, change lever depress lever to release detent.

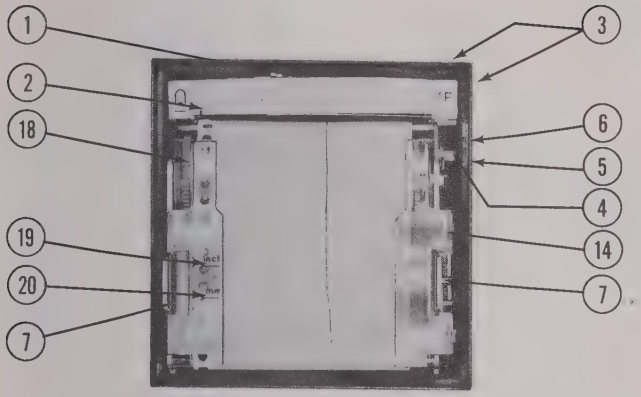


FIG. 6. MODEL 2762 RECORDER, OPEN

1. Zero adjusting lever
2. Pointer
3. Drilled holes for wire seal
4. Lever to switch motor, lock chopper bar, and disengage chart drive
5. Green mark: Motor switched on and chart drive locked
6. Red mark: Motor switched off, chart drive released, and chopper bar locked in upper position.
7. Finger grips for pulling out the chart drive

14. Hinged chart guide
18. Knurled wheel for chart drive roller
19. Time mark: Inches
20. Time mark: mm

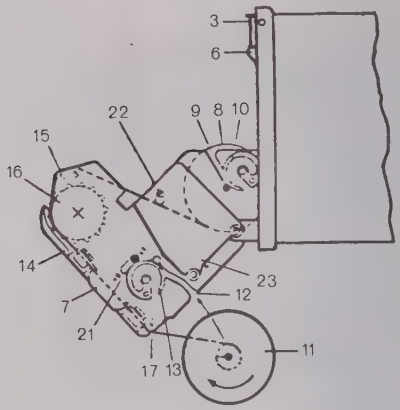


FIG. 7. CHART DRIVE PULLED OUT AND TILTED

3. Drilled holes for wire seal
4. Lever to switch motor, lock chopper bar, and disengage chart drive.
8. Feed spool
9. Slot for axle of feed spool
10. Spring catch for axle of feed spool
11. Take-up spool
12. Slot for axle of take-up spool
13. Spring catch for axle of take-up spool
14. Hinged chart guides
15. Recording edge
16. Chart drive roller
17. Chart guide bar
21. Gear change lever
22. Fastening screw for gear unit
23. Gear unit

TEMPERATURE MEASUREMENT

a. Locate probes at the points where temperature readings are desired. When measuring air temperature, allow several minutes for the temperature of the probe sensing element to stabilize before taking a reading. Liquid temperatures can be read within a few seconds after complete immersion of the probe body. The general rule is to allow sufficient time for the probe to attain the same temperature as the object being measured.

b. Set each channel range switch to the range most likely to be required, then take reading. Change range if necessary.

CAUTION

Do not use probe in acides or other solutions which will attack the brass shell of the probe or the plastic cord.

PORTABLE OPERATION

With the carrying handle attached, the Model 2762 can be used as a portable recorder. If operated on a horizontal surface, the supports should be folded away. This guarantees a vertical scale plane position, which is mandatory for accurate measurements.

PANEL MOUNTING

The Model 2762 recorder is designed for use in the vertical position. The recorder is normally mounted on a panel. A mounting bracket is furnished with each unit. (See Fig. 9 for the dimensions of the recorder and the panel opening.)

RECORDING WITH FREE CHART EXIT

For recording without a take-up reel, an accessory clear molded acrylic cover is available. A snap out section is provided in the bottom of the cover to allow for free exit of the chart. The chart paper may easily be torn off and saved for permanent record.

MAINTENANCE

The 2762 recorder requires little maintenance. Every 1000 hours, lubrication of the drive bearings with light oil such as 3 in 1 or sewing machine oil is recommended. Deposits of dust on the scale and the clamping bar should be removed from time to time with a soft brush.

ACCESSORIES

Gear Units: The standard gear unit supplied with the 2762 has a speed of 20/120 mm/hour. Three high speed gear units are available: 30/180 mm/hour, 60/360 mm/hour and 100/600 mm/hour.

GEAR UNIT CATALOG NUMBERS

SPEED MM/H	20/120	30/180	60/360	100/600
Catalog Numbers:	22300	22301	22302	22303

Chart Paper: The chart paper varies according to the gear unit used and the number of scale divisions suitable for the recorded range. The following table can be used to select the paper chart paper catalog numbers.

CHART PAPER CATALOG NUMBERS

	CHART SPEED			
DIVISIONS RANGES	20/120 mm/h	30/180 mm/h	60/360 mm/h	100/600 mm/h
−40° to 60°F 50° to 150°F	#23241	#23242	#23243	#23244

(Supplied in quantities of 10 rolls per box)

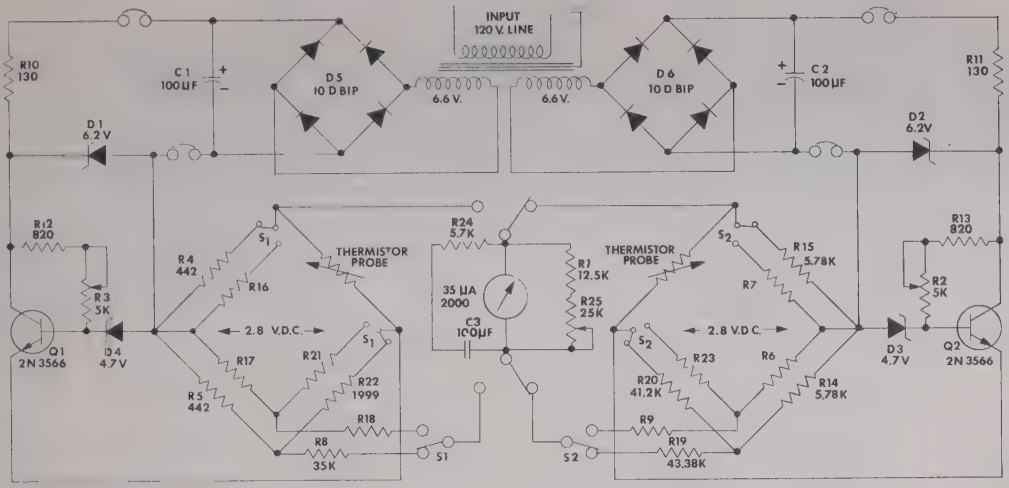
On all charts except those for 100/600 mm/h speed the time is marked in hours. The 100/600 mm/h paper is numbered 0 to 9 in 1 cm intervals.

NOTE

Model 2762 recorder is supplied with two rolls of chart paper. Additional chart paper is available in quantities of 10 rolls per box.

Other Accessories:

	Catalog #
Panel mount bracket Mounting frame for panel mounting	22391
Portable carrying handle	22392
Line cord—3 wire, 120 volt plug	22393
Line cord—3 wire pigtail	22394
Plastic window (for free chart exit)	22395
Glass window with phenolic frame	22396



UNLESS OTHERWISE SPECIFIED:
ALL RESISTOR VALUES ARE GIVEN IN OHMS.

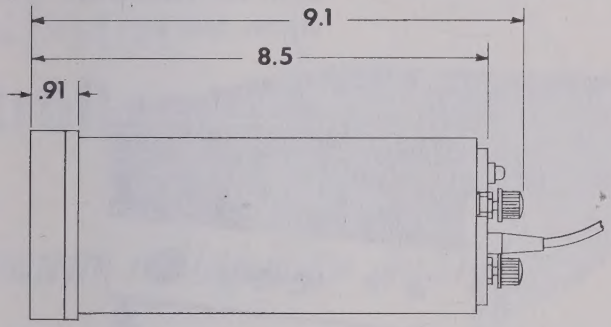
FIG. 8. MODEL 2762—SCHEMATIC DIAGRAM

PARTS LIST

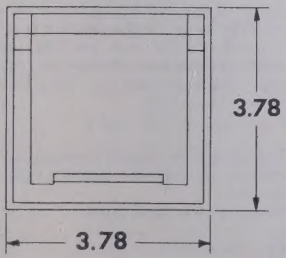
Ref. Symbol	Description	Simpson Part No.
TR	Transformer 115/6.3	5-114054
D0	Rectifier Diodes	5-114232
D3-4	Zener Diode 4.7V	5-113995
D1-2	Zener Diode 6.2V	5-113898
C1-2	Capacitor 100 MF 35V	5-114051
C3	Capacitor 100 MF 10V	5-114418
Q1-2	Transistor 2N-3566	5-113033
R1	Resistor 12.5K 1%	1-114094
R2-3	Potentiometer 5K	5-113901
R4-7	Resistor 442 1%	5-113917
R8-9	Resistor 35K 1%	1-115086
R10-11	Resistor 130 5%	5-114391
R12-13	Resistor 820 10%	5-113870
R14-17	Resistor 5786 1%	1-110744
R18-19	Resistor 43.38K 1%	1-111023
R20-21	Resistor 41.2K 1%	5-114442
R22-23	Resistor 1999 1%	1-110893
R24	Resistor 5.7K 1%	1-114198
R25	Potentiometer 25K	5-113859
S1-2	Rotary Switch 3P2T	5-114302
	Knobs for Switches	5-114021

CAUTION

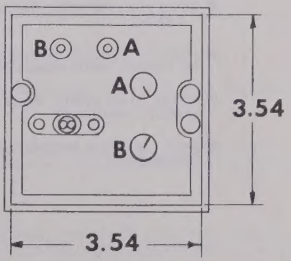
Do not use Domestic screws and nuts as a replacement — screw threads are metric.



SIDE VIEW



FRONT VIEW



REAR VIEW

FIG. 9. DIMENSIONAL DIAGRAM

Simpson
INSTRUMENTATION PRODUCTS

NEW

DIGITAL SYSTEM with INTEGRATED CIRCUITS

MODEL 2700

- **INTEGRATED CIRCUIT COMPACTNESS AND RELIABILITY**
- **ACCURACY WITHIN ±0.05%, ±1 DIGIT**
- **FULLY AUTOMATIC POLARITY SELECTION, WITH INDICATION**
- **4 FULL TIME DIGITS, PLUS 10% LINEAR OVERRANGE**
- **FAST: UP TO 5 NEW READINGS PER SECOND**

New Simpson 2700 digital system has an outstanding combination of features. Basic unit has four DC voltage ranges, capable of precise measurements from .0001 to 999.9 volts. Plug-in units are available for DC current, AC voltage, and resistance measurements. Convenience features include push-button front panel calibration check and automatic polarity selection (with indication). The 2700 weighs just 8 lbs., and is only 4 inches high, 8¼ inches wide. Its components and well-engineered design assure reliability. . . . I/Cs, FET input, and 200,000 hour readout lights.

OPTIONS

In addition to plug-in units for current, resistance, AC voltage, and capacitance measurements, the 2700 digital system is available with:

- 4 line BCD output
- Rack mounting
- External sample command

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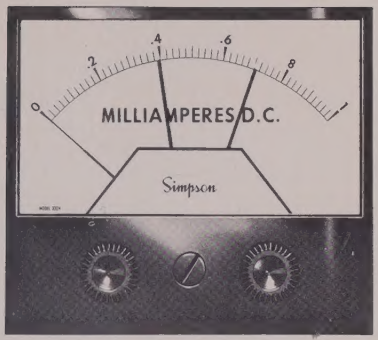
Simpson controllers



Maximum reliability design ...

Intended for control, alarm, and limit applications—with utmost dependability. Photoconductor sensing eliminates all interference with the indicating meter. High gain transistor switch circuit provides solid state reliability, accurate switching, and extremely small dead band. Control points are adjusted from the front panel thru a gear drive. The solid-state switching circuit triggers internal DPDT relays with 10-ampere contacts (one relay for each control point). Ideal for unattended operation, they can be obtained *from stock* in a wide selection of ranges, with either dual or single control points, and in three sizes.

CONTACTLESS

Sensing is accomplished with a photoconductor and infinite life lamp. By using light beams instead of contacts, the meter accuracy is completely unimpaired.

HIGH SENSITIVITY

Taut Band meters are available for operation on very small power—10μA @ 4,900 Ω available.

FAIL SAFE CIRCUITRY

These meter relays are designed for unattended operation. The internal slave relays are capable of switching 20 ampere 115 volt (resistive) loads. In the event of a power failure, these relays automatically "open".

RUGGED SEAL CONSTRUCTION

Completely sealed, with metal case and thick glass window, these meter relays will withstand rigorous environmental conditions. Shielded—they are not affected by panel mounting or stray magnetic fields.

EXTREMELY SMALL DEAD BAND

The difference between "on" and "off", with the measured value increasing or decreasing, is within 0.5% of full scale.

Get "off the shelf" delivery from your local electronic distributor.

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Tel: A. C. 201/751-1190

NEW YORK, BUFFALO 14216
Electrical Instrument Labs.
932 Hertel Avenue
Tel: A. C. 716/392-2726

NEW YORK, GREAT NECK, L. I. 11022
A & M Instrument, Inc.
Community Drive
Tel: A. C. 516/487-0500

NEW MEXICO, ALBUQUERQUE
Eberline Instrument Corp.
1404 San Mateo S.E.
Tel: A. C. 505/265-6655

NEW YORK, NEW YORK 10011
Electro-Tech Equipment Company
85 Tenth Avenue
Tel: A. C. 212/675-2400

NEW YORK, NEW YORK 10013
Nilsson Electronic Labs
103 Lafayette Street
Tel: A. C. 212/WA 5-1730

NEW YORK, VESTAL 13850
Compton Industries, Inc.
413 Commerce Road
Tel: A. C. 607/726-9221

NORTH CAROLINA, CHARLOTTE 28206
Electro Tech, Inc.
3107 Cullman Avenue
Tel: A. C. 704/333-0326

OHIO, CLEVELAND 44103
Pioneer- Standard Electronics, Inc.
5403 Prospect Avenue
Tel: A. C. 216/432-0010

OHIO, DAYTON 45404
Srepco Electronics Div.
314 Leo Street
Tel: A. C. 513/224-0871

PENNSYLVANIA, MONROEVILLE 15235
Edgerly Instrument Lab., Inc.
2366 Holliday Park Shopping Center
Tel: A. C. 412/327-4450

PENNSYLVANIA, PHILADELPHIA 19115
Sunshine Scientific Instrument
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Tel: A. C. 215/673-5600

WASHINGTON, SEATTLE 98119
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